Madison EMS
Patient Care Protocols 2008

Madison County Emergency Medical Services is committed to providing the citizens of Madison with the highest quality emergency medical care. The purpose of these protocols is to establish guidelines for the management and transport of specific medical emergencies. They are designed to advise the EMS provider in exercising good judgment in both basic and extraordinary circumstances. They are not intended to provide a solution to every medical problem that may be encountered. In addition, patient presentations may not fit within a specific protocol, some patients will fit in more than one. The provider is not to operate outside of these protocols unless directed by a medical command physician.

In most cases these protocols explicitly state the interventions to be performed in specific situations. **Medications** on standing order are written in **blue**, and instances where **medical command** is needed are either written in **red** or in a **red text box**. There are several expectations that are not expressed in every protocol. Depending on the patient presentation, certain interventions were intentionally not included to allow the provider to exercise judgment in treating their patient most appropriately. For instance, it is expected that all providers know to check vital signs on every patient, this is not listed. All providers should be familiar with these expectations, a list is provided below:

1. *Airway Management* – It should be obvious to the provider whenever an airway needs management, therefore, for both Enhanced- and Medic-level providers, the use of oxygen and the methods of securing a patient's airway are implied throughout. Those providers who are released to perform RSI should know when it is indicated, this will rarely be mentioned. For device specific directions or difficult airway troubleshooting, see the airway algorithm.

2. *CPR* – All providers should know when this intervention is indicated, therefore it will only be listed in certain protocols.

3. *ECG* – It is expected that the medic-level provider knows when and when not to monitor a patient's ECG. During situations where the ECG's indication is less clear, like after morphine sulfate administration, a reminder for its use is provided in the protocol.

4. *Intravenous/Intraosseous access* – It is expected that patients who need this procedure should have IV access attempted at least twice prior to an IO attempt. Rarely should IO access be done to an awake patient, and should only be done if the patient's condition is serious or if the procedure has been ordered by a physician. During a cardiac arrest, an IV should be attempted a max of twice before the next method of access is initiated.

5. *Manual Blood Pressures* – Most automatic, non-invasive blood pressure monitoring equipment can give false readings on occasion. For this reason, every patient will require at least one manual BP to be measured during their care. Further, if any erroneous auto NIBP readings or presumed erroneous readings (e.g., 280/230, 190/150) are encountered, a manual BP should immediately be performed to check for accuracy.

6. *Pediatric drug dosages* – When a drug is listed in the pediatric protocols, the suggested and max dosages are listed in most cases. When a max dose is not specifically stated, the adult dose for that drug should be considered the max dose.

7. *Pulse oximetry/ETCO2* – All critical respiratory patients are expected to be monitored for pulse oximetry and ETCO2.

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Adult | Abdominal Pain

Updated 8/5/08

Enhanced

- For hypotension (SBP <90 mmHg), **fluid bolus of 500 mL NS IV up to 1 liter.**
- For nausea and vomiting, consider **ondansetron 4-8 mg IV/IM.**

Medic

- Obtain a 12-lead ECG for patients age ≥40 years.

Contact Medical Command

- If SBP >90, consider **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**. If this treatment is initiated, ECG monitoring is required for the duration of transport.
- For persistent nausea or allergy to ondansetron, **promethazine 12.5-25 mg IV/IM**

Considerations

- Consider trauma as a cause of undiagnosed abdominal pain.
- Consider pregnancy as a cause of abdominal pain in women of childbearing age.

Adult | Alcohol Related

Emergencies involving alcohol can range from acute intoxication to alcohol withdrawal and delirium tremens (DT's). Acute intoxication causes behavioral changes and can cause respiratory depression, particularly if other sedative drugs are involved. The possibility of another illness (diabetes/hypoglycemia/CNS infection) or injury (head injury) must always be considered.

Enhanced

- **Infuse 1 liter NS**
- Check blood glucose level, administer **D50 25 g IV** if needed.

Medic

- For seizures, refer to Neurological protocol
- For severe agitation, tachycardia, or hallucinations, consider **Lorazepam 2-4 mg IV or midazolam 5 mg IM (repeat either in 10 min)**
- ECG monitoring

Adult | Allergic Reaction

Severe allergic reactions are life threatening with a mortality rate of approximately 3% requiring swift action. Care is focused on reducing or stopping the allergic reaction. The cardinal signs of severe allergic reactions are stridor, bronchospasm, and hypotension and may additionally include tightness in the chest, generalized hives, hoarseness and wheezes. The symptoms associated with severe allergic reactions may begin within seconds of exposure to an allergen or may be delayed up to 1 hour. However, typical response begins within minutes of exposure and primarily involves cardiovascular and respiratory system.

Enhanced

- Safely and rapidly remove patient from source of exposure, if necessary.
- Ice packs may be applied to a local exposure (i.e., bee sting).
- **Epinephrine 0.3 mg 1:1000 SQ repeat in 10 min** if patient is in extremis (e.g., unable to speak, absent breath sounds, hypotension).
- **Albuterol 2.5 mg/atrovent 0.5 mg nebulizer** for bronchospasm. **Repeat albuterol PRN.**
- If patient is hypotensive (SBP <90 mmHg), consider **IV bolus of 500 mL NS up to 1 liter.**
- **Diphenhydramine 25 mg IV/IM** for mild to moderate allergic reactions or **50 mg IV/IM** for severe allergic reactions or anaphylaxis.
- **Methylprednisolone 125 mg IV over 1 min** for severe hives or difficulty breathing.

Contact Medical Command

- **Epinephrine 1:10,000 0.5 – 1.0 mg IV push over 5 min** in *dire* circumstances
- **Dopamine 5-20 mcg/kg/min** to maintain SBP >90 mmHg
- **Epinephrine drip 2-10 mcg/min** to maintain SBP >90 mmHg

Adult | Cardiac | CODE

Updated 8/5/08

Cardiac arrest should be approached by addressing airway management and circulation issues. Special considerations such as maintaining body temperature, frequent re-assessment of interventions, and rapid transport should be observed in each of these cases.

Enhanced

- Assess airway for patency, obstruction, or foreign body.
- Check adequacy of any bystander CPR and take over if indicated.
- If patient is pulseless and apneic, use AED.
- Obtain blood glucose measurement. If hypoglycemia is suspected, treat with **25 g D50 IV/IO**, or with **glucagon 1 mg IM** if IV access is not available.
- Maintain body temperature, expose only as needed to assess and treat.

Medic

- Refer to rhythm-specific protocol.
- Consider nasal/orogastric tube placement for abdominal distension.

Considerations

- CPR should be hard and fast at a rate of 100 while ensuring full chest recoil.
- 1 cycle of CPR = 30 compressions, then 2 breaths; 5 cycles is approx 2 minutes.
- Once an advanced airway is placed, CPR should be continuous and no longer performed in cycles.
- Proper ETT position should be reconfirmed every time the patient is moved, or there is a change in patient status. Continuous monitoring of ETCO2 is indicated in all intubated patients.
- If a ROSC occurs, consider following the Induced Hypothermia in ROSC Guideline.

Adult | Cardiac | Asystole/PEA

Updated 8/5/08

Medic

- Confirm asystole is present in more than one lead.
- Administer **Vasopressin 40 units IV/IO** followed in 5-10 min by **epinephrine 1 mg, 1:10,000 repeated every 3-5 min**.
- **Atropine 1 mg IV every 3-5 min up to a total of 3 mg**
- Consider reversible causes and treat if suspected:
  - Hypovolemia – **NS IV fluid bolus**
  - Hypoxia – Appropriate airway management and **high-flow oxygen**
  - Hydrogen ion (Acidosis) – **Sodium bicarbonate 1 mEq/kg IV**
  - Hyperkalemia (known or suspected) – **Sodium bicarbonate 1 mEq/kg IV, calcium chloride 20 mg/kg IV, D50 25 g IV, albuterol 2.5mg ETT**
  - Hypoglycemia – **D50 25 g IV**
  - Hypothermia – Active rewarming, refer to specific protocol
  - Toxins – Empiric **sodium bicarbonate 1 mEq/kg IV, naloxone 0.8 mg IV/IM** refer to specific protocol
  - Tamponade, cardiac – **NS IV fluid bolus**
  - Tension pneumothorax – Needle thoracostomy
  - Thrombosis (coronary or pulmonary) – **NS IV fluid bolus**

Contact Medical Command

- If the patient remains in asystole/PEA after establishing a patent airway, performing good CPR, obtaining IV access, administering initial medications, and no treatable reversible causes have been identified, consider contacting medical command to discuss termination of resuscitative efforts.

Considerations

- If a ROSC occurs, consider following the Induced Hypothermia in ROSC Guideline.

Adult | Cardiac | Atrial Fib/Flutter

The prevalence of atrial fibrillation is increasing and its incidence doubles with each decade of adult life, with 5% of persons over age 65 affected. Presentations range from palpitations to pulmonary edema and stroke. Non-specific symptoms, such as fatigue and altered mentation are common in the elderly. In patients with paroxysmal atrial fibrillation, asymptomatic episodes are more common than symptomatic episodes.

Atrial flutter is second only to atrial fibrillation in frequency of atrial dysrhythmias, and shares many of the same disposing factors. They both are very closely related; atrial fibrillation often precedes or follows atrial flutter and may actually coexist in the same patient at the same time. Unlike atrial fibrillation, which is often chronic, atrial flutter is typically paroxysmal, rarely lasting more than a few hours, causing most of its symptoms related to rate.

Medic

- 12-lead ECG
- **IV 500 mL NS bolus**
- Ventricular rates >150 bpm with stable vital signs, consider **metoprolol 5 mg IV (repeat every 5 minutes to a total of 15 mg)** to obtain a ventricular response of 120 bpm or less.
- **Synchronized cardioversion** is indicated for *unstable* patients (i.e., SBP <90 mm Hg, altered mental status, signs of decreased peripheral perfusion, respiratory distress, and chest pain due to ischemic cause).
  Biphasic energy level escalation: 100 – 200 – 300 – 360 j.
- Consider **nitrous oxide** during cardioversion.

Contact Medical Command

- **Midazolam 2-5 mg IV prior to cardioversion**
- For patients who do not respond to cardioversion or who have recurrent tachycardia.

Considerations

- It is not desirable to cardiovert atrial fibrillation of unknown duration unless the patient is *unstable*, pharmacological rate control is the preferred intervention.
- Adenosine is not effective in converting atrial fibrillation or atrial flutter.
- *Metoprolol should not be administered if wheezing or signs of congestive heart failure are present, or if cocaine or methamphetamine use is suspected within last 24 hrs.*

Adult | Cardiac | Bradycardia

Bradydysrhythmia occurs with a ventricular HR <60. It may result from a broad range of clinical syndromes with varied pathophysiological processes. These rhythm disturbances may result from acute coronary syndromes, chronic ischemia, pharmacologic effects, toxic issues, metabolic effects, and chronic conduction system disease. Specific mechanisms include reversible ischemia, irreversible infarction, altered autonomic influence, poisoning of the pacemaker/conduction system, metabolic effect, and chronic degeneration of the system.

Medic

- 12-lead ECG
- For unstable patients with bradycardia (blood pressure of less than 90 mm Hg, altered mental status, signs of decreased peripheral perfusion) **Atropine 1 mg IV (every 3-5 min up to a total of 3 mg)**
- If hypotensive (SBP <90 mmHg), fluid bolus of **500 mL NS IV up to 1 liter NS.**
  - Fluid therapy should be initiated as an adjunct to rate-increasing therapies. *Symptomatic patients should not receive large amounts of fluid until attempts to resolve the bradycardia have been initiated.*
- **Transcutaneous pacing (TCP)** is the treatment of choice in 2° Type II and 3° AVB.
  - Initiate at a rate of 80, starting at a mA level of 0 and increasing until mechanical capture is obtained. Consider pain management using patient controlled inhaled **nitrous oxide** during TCP.
- For unstable patients who have not responded to transcutaneous pacing/atropine/NS bolus, consider **dopamine 5 to 20 mcg/kg/min** to maintain a SBP >90 mmHg.

Contact Medical Command

- **Midazolam 2-5 mg IV** during TCP
- **Epinephrine drip 2-10 mcg/min** for refractory hypotension to maintain BP of 90 mmHg

Considerations

- Transplanted hearts will not respond to atropine.

Adult | Cardiac | Chest Pain (ACS)

Updated 8/5/08

Enhanced

- **Aspirin 324 mg** (4 baby aspirin) chewed
- **Nitroglycerin 0.4 mg SL every 5 min** with a SBP >100 mmHg.
- Apply **1 inch of nitropaste (15 mg)** topically keeping SBP >100 mmHg.
- For patients with repeated vomiting or significant nausea, consider **ondansetron 8 mg IV/IM.**
- Obtain 12-lead ECG, refer to 12-lead Guideline.

Medic

- If pain persists, consider **morphine 2 mg slow IV every 5-10 min to a total of 6 mg** maintaining a SBP >100 mmHg.
- If the patient is allergic to morphine, consider **nitrous oxide**.

Contact Medical Command

- For patients with persistent chest pain after above measures, and/or a 12-lead ECG indicating an acute myocardial infarction, pulse rate greater than 80 and SBP >120 mmHg, **metoprolol 5 mg IV every 5 min up to a total of 15 mg.**
- If SBP> 90 and an alternative to morphine is needed, consider **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**.
- Before giving nitrates to anyone who has taken Viagra (sildenafil citrate), Levitra (vardenafil HCL) or Cialis (tadalafil) within the previous 24 hours.

Considerations

- Patients who have a field 12 lead ECG that indicates an acute myocardial infarction are candidates for rapid transport and the receiving hospital should be notified as soon as possible of the results of the ECG. Consider additional IV access.
- Metoprolol should not be administered if wheezing or signs of CHF are present, or if cocaine or methamphetamine use is suspected within the last 24 hours.
- Consider serial 12-leads in the patient with intermittent symptoms.
- *A normal 12-lead ECG does not allow a non-transport, nor does it allow a transfer to a BLS crew!*
- Recent studies have shown that morphine might increase the possibility of a poor outcome when given to chest pain/ACS/CHF patients, yet no study has conclusively proven this as fact. Use caution when choosing patients to whom morphine is given. Only give it to those who have a stable BP and are experiencing *excruciating* pain.

Adult | Cardiac | Tachycardia-PSVT

Paroxysmal supraventricular tachycardia (PSVT) frequently occurs in otherwise healthy individuals, and is therefore usually well tolerated. However, if the rate is particularly rapid (>150 beats/min), or the arrhythmia is sustained, heart failure may occur. There are other conditions that cause physiological tachycardia which mimic SVT. The treatment goal for these situations is to treat the underlying condition, not the tachycardia itself. (i.e., hypotension, dehydration, or blood loss).

Medic

Stable SVT

- Maneuvers to increase vagal tone (valsalva, carotid sinus massage).
- **Adenosine 6 mg IV**. If no response, **adenosine 12 mg rapid IV**.

Unstable SVT

- Maneuvers to increase vagal tone (valsalva, carotid sinus massage).
- **Adenosine 6 mg IV**. If no response, **adenosine 12 mg rapid IV**.
- **Synchronized cardioversion** is indicated for unstable patients (SBP <90mmHg, altered mental status, signs of decreased peripheral perfusion). Consider pain control with **nitrous oxide**.
- **Biphasic energy level escalation: 50 – 100 – 200 – 300 – 360 j.**
- If the patient is hypotensive (SBP <90 mmHg), consider **IV bolus of 500 ml NS up to 1 liter.**
- For patients who have not responded to cardioversion or who have recurrent arrhythmia, consider **amiodarone 150 mg IV over 10 min**.

Contact Medical Command

- Administer **midazolam 2-5 mg IV** prior to **synchronized cardioversion**.
- If no response to adenosine 12 mg in stable SVT.

Considerations

- Always consider a wide complex tachycardia to be ventricular tachycardia unless known to be a SVT.
- Adenosine is to be administered by rapid IV push (over 1 to 3 seconds at a proximal injection port), followed by a rapid 20 mL flush.
- Theophylline or related methylxanthines (caffeine) can block the effects of adenosine. Dipyridamole (persantine) and carbamezapine (tegretol) may potentiate the effects of adenosine.
- Perform carotid sinus massage unilaterally if patient is under 50 years of age. *CSM is contraindicated if bruits are heard (either side), history of carotid endarterectomy, or CVA.*

Adult | Cardiac | VT/VF Arrest Updated 8/5/08

Medic

- **Biphasic energy level escalation** for Lifepack 12: **200 – 300 – 360j.**
- If downtime <5 min, immediate **defibrillation at 200j.** If downtime >than 5 min, CPR for 2 min, followed by **defibrillation at 200j**.
- ALS providers should consider the shock delivered by the AED as part of their protocols.
- If the patient has not responded to the first defibrillation at 200j/CPR cycle:
  - **Vasopressin 40 units IV/IO**, followed in 5-10 min by **epinephrine 1 mg (1:10,000) IV every 3-5 min**.
- If VF/VT persists after the 3 CPR/defibrillation cycles, administer **amiodarone 300 mg IV push**. Patients who initially respond to amiodarone but have recurrent VF/VT may be re-dosed with **amiodarone 150 mg IV push**.
  - Consider **magnesium 1-2 grams IV push** for torsade de pointes when a pre-existing long QT syndrome is known or suspected.

Contact Medical Command

- Patients who have had a secure airway established and have not responded to 20 min of resuscitative efforts including repeated defibrillations and administration of appropriate medications may be candidates for the cessation of resuscitative efforts in the field.

Considerations

- CPR should not be interrupted for administration of IV drugs.
- If a ROSC occurs, consider following the Induced Hypothermia in ROSC Guideline.

Adult | Cardiac | VT (with a pulse)

Eight out of 10 patients presenting with a wide-complex tachycardia (QRS >120 msec) are diagnosed with VT. If the patient has a history of CAD, the incidence increases to 95%. However, VT is commonly misinterpreted as being SVT with aberrancy, especially due to the incorrect assumption that VT cannot present with a narrow-complex or in an awake, asymptomatic patient. In the prehospital setting, VT can be difficult to distinguish from other fast, wide or narrower-complex rhythms. Our goal is to treat the symptoms with a broad spectrum antidysrhythmic, either pharmacological or electrical, both of which are often effective for most fast and wide, or narrow-complex dysrhythmias. Always obtain a 12-lead in addition to monitoring the ECG, and transmit to the ED if possible.

Medic

- Obtain 12-lead ECG.
- If patient is stable (SBP >90 mmHg, normal mental status, good peripheral perfusion) administer **amiodarone 150 mg IV over 10 min, repeat in 10 min** if patient does not respond.
- **Synchronized cardioversion** if patient is unstable, (SBP <90 mm Hg, altered mental status, signs of decreased peripheral perfusion). Consider pain control with **nitrous oxide**.
- **Biphasic energy level escalation: 100 – 200 – 300 –360 j.**

Contact Medical Command

- **Midazolam 2-5 mg IV** prior to **synchronized cardioversion**

Adult | Environmental | Envenomation

Updated 8/5/08

Enhanced

- Pit Vipers (copperheads, rattlesnakes, etc) – minimize the patient's activity, remove tight clothing or jewelry. If the bite is on an extremity, splint at heart level.
- *Constricting bands or tourniquets, cold application, incision and/or suction, and extractor devices are contraindicated in pit viper envenomations.*
- If the patient is hypotensive (SBP <90mmHg), consider **IV bolus of 500 mL NS up to 1 liter**.

Medic

- Initiate ECG monitoring.
- For moderate to severe pain and a SBP> 90, **morphine sulfate 2-10 mg IV** (at no greater than 3 mg/min), or **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**. **Medical Command** can be contacted for additional orders.
- Consider pain management using patient controlled inhaled **nitrous oxide**.

Contact Poison Control (1-800-451-1428)

- Use Poison Control Physician as Medical Command, carefully document name of physician. MedCom must still be contacted.
- For additional **fentanyl >250 mcg IV**
- When other Exotic Animals (Coral snakes, Cobra's, etc.) have caused the poisoning.
- **Dopamine 5 to 20 mcg/kg/min IV** or **epinephrine drip 2-10 mcg/min** for hypotension unresponsive to fluid therapy.
- **Lorazepam 2-4 mg IV** for abdominal pain or muscle spasm from suspected black widow spider envenomation.
- **Meperidine 50-100 mg IV/IO only** if patient is allergic to morphine of fentanyl.

Considerations

- Pit Viper: Symptoms may be acute and marked – tissue swells at the bite mark within min and spreads proximally; pain begins quickly in significant envenomations. Swelling and ecchymosis spread and hemorrhagic blisters may form.
- In the case of exotic animals or non-indigenous species, animal identification may be very important in obtaining specific antivenin or otherwise guiding therapy.
- Black widow spider envenomations may present with painful muscle spasms.

Adult | Environmental | Hyperthermia

Heat cramps are painful cramps or spasms of large muscle groups encountered during exertion in hot environments.

Heat exhaustion is a syndrome of dizziness, nausea, vomiting, weakness, and, occasionally syncope which may be associated with a normal body temperature or a moderate temperature elevation. There is no sustained change in mental status, and the skin is usually wet from profuse diaphoresis.

Heat Stroke is the most severe form of heat illness. Patients with heat stroke present with disorientation, seizures, and/or coma. Historically, heat stroke was defined as the triad of hyperpyrexia (temperature >105 F), CNS dysfunction, and lack of sweating. However, lack of sweating is not an absolute diagnostic criterion since many heat stroke patients may present with profuse sweating.

Enhanced

- Obtain accurate body core temperature, if possible.
- **Heat exhaustion**: Carefully begin hydration with water, if patient can tolerate liquids by mouth. Do not give large amounts of fluid rapidly or administer fluids by mouth to any patient who has an altered mental status. If temperature >103 F (39.4 C), cool patient with tepid wet towels, or fans and spray water.
  - Remove cooling agent when temperature reaches 100 F (37.7 C) to avoid too rapid of a temperature drop which may initiate the shivering process (which will increase temperature).
  - Fluid therapy bolus up to **1 liter NS IV** with evidence of hypovolemia or hemodynamic compromise, or severe heat cramps with painful, involuntary muscle spasms.
- **Heat stroke**: Aggressive evaporation cooling is indicated (using fine mist water spray and forced air stream with fans), apply ice packs to groin and axillae.
  - Continue cooling until core temperature ≤104 F (40 C) to avoid too rapid of a temperature drop, or shivering begins (which will increase temperature).
  - Cautious fluid therapy initially at **250 mL/hr of NS**. If evidence of hypovolemia or hemodynamic compromise exists, then initiate fluid therapy bolus up to **1 liter NS IV** to maintain SBP >90 mmHg.

Considerations

- The major difference between heat exhaustion and heat stroke is CNS impairment.
- The treatment of heat exhaustion is rest with fluid volume and electrolyte replacement.
- Severe heat cramps will respond to rest and intravenous hydration with NS.
- *Dehydration and volume depletion may not occur in classic heat stroke. Vigorous fluid administration may produce pulmonary edema, especially in the elderly.*

Adult | Environmental | Hypothermia

Hypothermia, by definition, is a core temperature <95 F (35 C). According to AHA ACLS guidelines:

Mild hypothermia ranges between 93.2 – 96.8 F (34 – 36 C)

Moderate hypothermia ranges between 86.0 – 93.2 F (30 – 34 C)

Severe hypothermia is a core temp <86 F (30 C). Modifications in the treatment of the cardiac arrest patient should be made.

Enhanced

- *Patient Unresponsive or in Cardiac Arrest*:
  - Confirm pulselessness for *30-45 seconds* if severe hypothermia is suspected or known. If no pulse detected and no other signs of life are present, CPR should be initiated.
- *Patient not in Cardiac Arrest*:
  - Remove wet garments. Protect against heat loss and wind chill using blankets and insulating equipment. Avoid rough handling and excessive movement. Maintain a horizontal (supine) position. For body temperatures of 86 – 93 F (30 – 34 C) apply warm heat packs to neck, armpits and groin only.
- Fluid **bolus of 500 mL NS IV up to 1 liter** if indicated for hypotension to maintain a SBP >90mmHg.

Medic

If in cardiac arrest, modifications should be made using the following ACLS algorithm guidelines:

- Temperature <86 F (30 C):
  - Perform a single defibrillation attempt for VF/VT.
  - Continue CPR.
  - **Withhold all IV medication until core temperature rises above 86 F (30 C).**
- Temperature >86 F (30 C):
  - **Give IV medications as indicated at twice the standard time intervals** (e.g., if interval is 3-5 min for epinephrine, now 6-10 min).
  - Repeat defibrillation for VF/VT as core temperature rises.

Contact Medical Command

- Patients who have been found in cardiac arrest and are hypothermic may be candidates for termination of resuscitative efforts in the field if they do not respond to initial resuscitative efforts and there is a prolonged time to reach definitive care.

Considerations

- Hypothermia can occur at any time of year.
- Consider hypoglycemia as a cause of hypothermia in appropriate clinical setting.
- If possible, fluids should be warmed to 109 F (42.7 C) prior to infusion. This may be accomplished by warming on heater vent, or wrapping with a chemical heat pack. IV fluids should *not* be warmed in a microwave oven.
- Providers should look for “urban” hypothermia in inner city areas, where it has a high association with poverty and drug and alcohol abuse (can occur in rural areas also)

Adult | Environmental | Near Drowning

Drowning is the fourth most common cause of trauma related death in the United States. It can occur anywhere from a residential bathroom to area lakes. Near Drowning is defined as a submersion accident with recovery of vital signs and survival greater than 24 hours post incident. The primary mechanism of death in drowning is hypoxia and suffocation due to lack of oxygen or atelectasis of lung tissue. Patient survival is based largely on early access, aggressive management and resuscitation intervention.

Enhanced

- Remove from water if so trained, and it is safe to do so.
- Spinal immobilization, if indicated.
- If patient is hypotensive (SBP <90 mmHg), consider **IV bolus of 500 mL NS up to 1 liter.**
- Consider **CPAP** if patient is awake and in respiratory distress. Refer to specific protocol.

Medic

- Refer to specific protocol for cardiac arrhythmias or if patient is in cardiac arrest as indicated.

Considerations

- Type of incident (surface impact, submerged object strike, propeller trauma).
- If submerged, how long under and how deep?
- Weather conditions, water temperature, temperature at depth discovered (if SCUBA recovery).
- Hypothermic patients have slowed uptake and circulatory functions and are candidates for prolonged resuscitation efforts and transport to hospital. Follow “Hypothermia” protocol if immersion is in water.
- *Patient should be seen by physician – near drownings can cause respiratory compromise hours after the initial incident.*

Adult | Neurological | ALOC

Altered level of consciousness (ALOC) is a symptom, not a diagnosis, with many possible causes, both medical and traumatic. Common etiologies include: diabetic problems (hypo/hyperglycemia), alcohol or drug intoxication, metabolic abnormalities, seizures or postictal states, toxic exposure, hypoxia, sepsis, stroke, and head trauma. Multiple patients with an ALOC suggest toxic exposure/drug ingestion – think carbon monoxide in such cases.

Enhanced

- Spinal immobilization, if indicated.
- Check blood glucose, **D50 25 g IV** for hypoglycemia with any degree of neuro abnormalities.
  - If unable to establish venous access, administer **glucagon 1 mg IM, repeat in 10 min** if hypoglycemia is still suspected.
- If narcotic overdose is suspected, **naloxone 0.8 mg IM/SLOW IV**.
  - *If intubated, the patient should not receive naloxone*.
- For hyperglycemia, BS >400 mg/dl, **infuse 1 L NS**, monitoring closely for signs of fluid overload.

Medic

- Monitor and obtain 12-lead ECG

Considerations

- **Naloxone** may be administered **IM up to 1.6 mg (2 mL)** per injection site. See the Adult/Peds: Toxicology protocol for a list of meds that respond to naloxone.
- Blood glucose determinations in the field may be helpful in determining whether hypoglycemia is a potential cause of ALOC, but should be interpreted with caution, particularly if values are borderline. If hypoglycemia is suspected, it should be treated regardless of the reading.
- Medications are a common cause of ALOC and every effort should be made to identify the patient's medications and obtain the medications and accurate list for the receiving hospital.

Adult | Neurological | Seizures

Seizures are defined as an episode of abnormal neurologic function caused by an abnormal electrical discharge of brain neurons. There are many episodic disturbances of neurological function that can mimic a seizure.

Status Epilepticus is a true medical emergency defined as either continuous seizures lasting at least 5 min or two or more discrete seizures, without complete recovery of consciousness in-between.

Enhanced

- Protect the actively seizing patient. Do not attempt to restrain.
- Check blood glucose and administer **D50 25 g IV** for persistent seizures, or suspected hypoglycemia. **Administer glucagon 1 mg IM** if IV attempts are unsuccessful. **Glucagon** can be **repeated in 10 minutes** if necessary.

Medic

- Initiate ECG monitoring
- Administer **lorazepam 2-4 mg IV, repeat in 10 minutes for persistent seizures**. If unable to establish venous access, administer **midazolam 5mg IM, repeat in 10 minutes**, for persistent seizures.

Contact Medical Command

- For further repeat dosing of **lorazepam or midazolam**
- For **diazepam 2-5 mg IV** if patient is allergic to **lorazepam/midazolam**

Considerations

- If patient is pregnant, refer to OB/GYN protocol for further guidance.
- The patient's history of seizures and medications they take are of particular interest to the receiving hospital.

Adult | Neurological | Stroke

Enhanced

- Focused neurological exam: Cincinnati Prehospital Stroke Scale (Facial Droop, Arm Drift and Speech).
- "When was the last time the patient was seen normal/at baseline?"
- If any type of neurological symptoms are present, check blood glucose and administer **D50 25 g IV** if necessary. Administer **glucagon 1 mg IM** if IV attempts are unsuccessful. **Glucagon** can be **repeated in 10 minutes** if necessary.

Medic

- Obtain 12-lead ECG

Considerations

- Is the patient taking warfarin (Coumadin) or other anticoagulant medications?
- Reassess neurological status, minimum every 15 min.
- *If the patient can be considered for stroke intervention, it is very important that their baseline neurologic status can be identified, that the time of onset of symptoms is identified, that their medications are known, and that a family member or medical decision maker can be available if needed.*
- If Stroke/CVA is suspected and symptom onset time is <3 hours, consider helicopter instead of long transport.
- The Cincinnati Prehospital Stroke Scale is useful for identifying patients with acute stroke symptoms.

Adult | OB/GYN | Childbirth

Most childbirth events are uncomplicated and require support and care for the mother and the newborn. If complications occur (limb presentation, placenta previa, placenta abruptio, prolapsed cord) rapid transportation is in order (consider Medevac).

Enhanced

- Administer high-flow oxygen
- Visualize perineum for crowning (bulging perineum), imminent delivery.
- Transport 3rd trimester patients on their left side (pillow under hip). If immobilized, tilt backboard on left side.
- Establish IV access, NS. Maintain SBP >90 mmHg.

Uncomplicated Birth

- Assess for amniotic sac rupture.
- Support infant's head over perineum.
- Once head appears, suction mouth and nostrils using bulb syringe.
- Check for cord around infant's neck.
- Apply gentle traction downward on infant's head until the anterior shoulder appears. Then guide infant upward to deliver posterior shoulder.
- Keep infant at same level as placenta.
- Clamp cord with two cord clamps – one 8 inches and the second 10 inches from the infant.
- Cut the cord between the clamps. If cord around infant's neck, cut the cord between the clamps, then unravel from neck.
- Keep the infant warm, including the head.
- Record time of birth.
- Assess and record APGAR's at 1 min and 5 min.
- It is not necessary to await the delivery of the placenta prior to transport.

Prolapsed Cord/Limb Presentation

- *Do not attempt to push the cord or limb back in!*
- Insert two fingers of gloved hand into vagina to raise the presenting part of the fetus off the cord. Simultaneously, check cord for pulsations in vagina, and push baby's head away to keep pressure off of cord (maintain throughout transport).
- Place mother in a knee-chest position (if possible). If mother unable to comply, place in a trendelenburg position instead.
- Continue to hold pressure off of cord. Keep cord moist with sterile saline.
- Transport immediately with early notification to receiving emergency department.

Breech Birth

- Support the baby's extremities or buttocks until the upper back appears.
- Grasp the baby's hips and apply gentle downward traction. Do not apply traction to the baby's legs or back.
- Swing the infant's body in the direction of least resistance – either right or to the left. By alternate swinging, both shoulders will deliver posteriorly.
- By splinting the humerus and applying gentle traction, the two arms can be delivered.
- Gentle abdominal compression of the uterus will engage the baby's head. Apply downward traction until the baby's hair is visible. Swing the legs upward until his body is in a vertical position. This maneuver permits the delivery of the head.
- Suction the mouth and nostrils using a bulb syringe.
- Cut the cord utilizing standard procedure.
- Keep the infant warm, including the head.
- Record the time of birth.
- Assess and record APGAR's at 1 and 5 min.

Adult | OB/GYN | Childbirth (continued)

Medic

- A pregnant patient in cardiac arrest should be managed according to ACLS Guidelines with rapid transport to the hospital and early notification to the emergency department.

Contact Medical Command

- Eclampsia is a medical emergency for both mother and fetus. When suspected and the patient is experiencing tonic-clonic seizure activity, administer **magnesium sulfate 2-4 g IV push at no greater than 1 g per min** until seizure stops. **Max dose 4 g.**
- Always call for guidance with any complicated field delivery.
- Adverse effects of **magnesium** treatment include muscle weakness and respiratory depression and should be treated with **IV calcium chloride, 1 gm IV**

Considerations

- Manual vaginal examinations are never to be done in the prehospital setting.
- *If birth is imminent, stay and deliver the baby. If high risk or complicated, attempt delivery en-route to the hospital.*
- Document presentation, date and time of birth (baby and placenta), appearance of amniotic fluid, APGAR's, appearance of placenta and any resuscitation procedures required.

Adult | OB/GYN | Sexual Assault

Enhanced

- Confirm scene safety.
- Do not examine the genitalia unless patient is hemorrhaging and a dressing is required to control it.
- Save any clothing removed during your care. Place items in a paper bag (plastic induces moisture).
- Advise patient not to urinate, defecate, douche, or wash before emergency department evaluation.
- Establish IV access only if indicated by patient condition.

Considerations

- When taking a patient history, obtain only pertinent facts related to the trauma (LOC, dyspnea, bleeding, weapon involved, etc.). Do not question the patient about prior events, or attempt to obtain information (assailant description, etc.) not directly related to patient care. Ensure that appropriate law enforcement agencies have been informed.

*****Communicate mileage before and after transport with dispatch center.*****

Adult | OB/GYN | Vaginal Bleeding

Enhanced

- Administer high-flow oxygen
- Collect any tissue or fetal parts present. Place in paper bag, and then into a plastic bag for physician examination.
- If unstable (SBP <90 mmHg, altered mental status, and signs of poor peripheral perfusion), treat for shock.

Considerations

- Determine last menstrual period.
- Always consider pregnancy and complications as a source of vaginal bleeding in women of child-bearing age
- *Third trimester vaginal bleeding may constitute an emergency for mother as well as fetus. Consider very early ED notification.*

Adult | Psychological

Substance-induced disorders (intoxication, withdrawals, etc.), organic causes (cerebral lesions, etc.), diabetic emergencies (hypo/hyperglycemia), and hypoxia must be ruled out before a patient's condition is provisionally diagnosed as psychiatric.

Medic

- If it is determined that the patient's symptoms are psychological, they are unfit to care for themselves, and they need evaluation at the ED, have Law Enforcement dispatched to the scene.
- For physical and chemical restraint standing orders (**haloperidol, diphenhydramine, lorazepam, midazolam**), refer to the Restraint Guideline.

Contact Medical Command

- If patient refuses transportation for medical evaluation, consider consult with Medical Control Physician for possible Emergency Custody Order (ECO).
- Suicidal patients are not permitted to sign a refusal for care/transport. Consultation with law enforcement/mental health professionals/Medical Control Physician should guide patient disposition.

Considerations

- History of psychological/psychiatric illness? Under treatment for any psychiatric condition? Taking psychotropic medications for condition?
- What precipitated the event? Any other pertinent medical history? Significant recent stressor? History of recent alcohol/drug use? History of trauma?

Adult | Pulmonary | Dyspnea

Updated 8/5/08

Enhanced

- Manage airway appropriately
- Administer oxygen as required to maintain oxygen saturation of at least 90%. For patients on home oxygen start with their normal oxygen flow rate and titrate as needed.
- Consider **CPAP** if patient has moderate to severe symptoms. See CPAP Guideline.

Dry (wheezes, Hx of COPD, asthma)

- **Albuterol 2.5 mg/atrovent 0.5 mg by nebulizer. Repeat albuterol PRN.**
- Administer **methylprednisolone 125 mg IV**

Wet (rales, frothy sputum, JVD, edema)

- Consider taking patient's temperature to help rule out pneumonia.
- If CHF is strongly suspected, give **nitroglycerin 0.4 mg SL every 5 min** with SBP >100 mmHg.
- Apply **1 inch of nitropaste (15 mg)** topically keeping SBP >100 mmHg.

Medic

- If patient has a contraindication for epinephrine and/or condition has worsened, consider **magnesium sulfate 1-2 g (diluted in 10cc NS) slow IV/IO**
- If so trained, consider **RSI** for the patient with CPAP-refractory dyspnea – Refer to the RSI Guideline

Medic

- **Captopril 25 mg SL** if SBP >140 after nitrates.
- Obtain 12-lead ECG.
- If SBP >90 mmHg, consider **morphine sulfate 2-4 mg slow IV.**
- Consider **dopamine 5-20 mcg/kg/min IV drip** for persistent hypotension (SBP <90 mm Hg).
- If so trained, consider **RSI** for the patient with CPAP-refractory dyspnea – Refer to the RSI Guideline

Contact Medical Command

- If patient is in extremis and is between the ages of 12 and 50 years old without a cardiac history, administer **0.3mg epinephrine 1:1000 SQ repeat in 10 min.**
- Before giving nitrates to anyone who has taken Viagra (sildenafil citrate), Levitra (vardenafil HCL) or Cialis (tadalafil) within the previous 24 hours.
- Adverse effects of **magnesium** treatment include muscle weakness and respiratory depression and should be treated with **IV calcium chloride, 1 gm IV**

Considerations

- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate.***
- Wet breath sounds are not always CHF-related. Breath sounds localized to one (or both) sides of the chest could be presenting with pneumonia. Since it is quite common for the patient presenting with pneumonia to be febrile, it is always a good practice to measure and document the dyspneic patient's temperature to help arrive at the most effective treatment.
- Recent studies have shown that morphine might increase the possibility of a poor outcome when given to chest pain/ACS/CHF patients, yet no study has conclusively proven this as fact. Use caution when choosing patients to whom morphine is given. Only give it to those who have a stable BP and are experiencing *excruciating* pain.

Adult | Toxicology | Poisoning/OD

Updated 8/5/08

It is impossible to include all potential toxic exposures or poisonings in this protocol. Management of the poisoned/overdose patient focuses on several principles; decontamination limits further absorption and minimizes the extent of toxicity; supportive care limits the effects of the serious complications of poisoning on the primary systems at risk; and definitive care limits the severity of duration of toxicity through the use of pharmacological antagonists (antidotes) or enhances elimination of the toxin itself.

Enhanced

- Scene safety (consider HazMat). Identify substance, decontaminate patient, if trained.
- Flush skin/mucous membranes with appropriate solution, if indicated.
- Initiate fluid bolus if hypotension is present. **500 mL bolus NS IV up to 1 liter**.

Consider drug-specific therapies:

- **Opioid OD** (alfentanil, buprenorphine, butorphanol, codeine, dezocine, fentanyl, heroin, hydrocodone, hydromorphone, levorphanol, meperidine*, methadone, morphine, nalbuphine, oxymorphone, oxycodone, pentazocine, propoxyphene*, remifentanil, sufentanil, tramadol*)
  *These drugs are unlikely to cause pinpoint pupils
  - For CNS depression, give **naloxone 0.8 mg SLOWLY IVP** and stop when the patient is breathing adequately, may be given IM if no IV access**.** *If intubated, the patient should not receive naloxone.*

- **Dystonic Reaction from phenothiazines or antipsychotics** (chlorpromazine, fluphenazine, haloperidol, loxapine, molindine, perphenazine, pimozide, promethazine, trifluorperazine, trifluprom azine, thiothixene)
  - For spasms of the tongue, face, neck or back, and/or facial contortions, give **diphenhydramine 1.0 mg/kg slow IV push, max dose 50 mg**.

Medic

Consider drug-specific therapies:

- **Any unknown OD** where the QRS >0.12 seconds**,** give **sodium bicarbonate, 1 mEq/kg IV bolus over 2 min.**

- **Tricyclic Antidepressant OD** (amitriptyline, clomipramine, desipramine, doxepin, imipramine, maprotiline, nortriptyline, protriptyline, trimiprimine)
  - For QRS >0.12 seconds, hypotension not responsive to IV fluids, dysrhythmias, seizures, give **sodium bicarbonate 1 mEq/kg IV bolus over 2 min**.

- **Calcium Channel Blocker** (diltiazem, amlodipine, felodipine, isradine, nicardipine, nifedipine, nimodipine, nisoldipine, verapamil) or **Beta-blocker OD** (acebutolol, atenolol, betaxolol, bisoprolol, carteolol, carvedilol, labetalol, metoprolol, nadolol, penbutolol, pindolol, propranolol, timolol)
  - For bradycardia, QRS >0.12 seconds, heart block, hypotension, give **calcium chloride 20 mg/kg slow IV push over 10 min**. *Do not allow extravasation, use free flowing IV, and never give in a hand vein.*
  - Transcutaneous pacing for persistent bradycardia and hypotension.
  - **Dopamine 5-20 mcg/kg/min** to maintain SBP >90 mmHg.
  - Consider **glucagon 2-5 mg IV**.
  - Consider **sodium bicarbonate, 1 mEq/kg IV bolus over 2 min**.

- **Organophosphate** (insecticides, herbicides, OP compounds, malathion, parathion, diazinon, fenthion, dichlovos, chlorpyrifos, most ophthalmic agents, isoflurophate, trichlorfon)
  - For SLUDGE (**S**alivation, **L**acrimation, **U**rination, **D**efecation, **G**astrointestinal upset, **E**mesis), or airway secretions, severe bronchospasm, seizures, or bradycardia, give **atropine 0.05 mg/kg doubled every 5 to 10 min (no max dose)** until signs of decreased secretions. *Tachycardia is not a contraindication to atropine administration.*

Contact Poison Control (1-800-451-1428)

- For all complicated overdoses use poison control physician as medical command, carefully document name. MedCom must still be contacted.
- For **epinephrine drip 2-10 mcg/min as alternative to dopamine** for hypotension.

Adult | Trauma | Amputation

Updated 8/5/08

The partial or complete severance of a digit or a limb is an amputation. Candidates for reimplantation include the victims of amputation of the scalp, hand, digit, penis and selected portions of distal extremities.

Enhanced

- Assess the patient for associated injuries that may be of a higher priority.
- Apply direct pressure to control hemorrhage. A tourniquet should be avoided when possible. *If a tourniquet must be placed, use only the smallest amount of pressure over the widest area to achieve hemorrhage control*.
- In the case of incomplete amputation, splint entire digit or limb in a physiologic position, if possible.
- Place part in damp (not wet) gauze, place in plastic bag, wrap in trauma dressing and place on ice/water mix.
- Fluid **bolus of 500 mL NS IV up to 1 liter** if indicated for hypotension, to maintain a SBP >90mmHg.

Medic

- For moderate to severe pain and a SBP> 90, **morphine sulfate 2-10 mg IV** (at no greater than 3 mg/min), or **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**. **Medical Command** can be contacted for additional orders.
- Consider pain management using patient inhaled **nitrous oxide**.
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl >250 mcg**
- **Meperidine 50-100 mg slow IV only** due to morphine and fentanyl allergy.
- Before giving **morphine/fentanyl** to multisystem trauma patients.

Considerations

- Never freeze the amputated part by placing it directly on ice or by adding any other coolant, such as dry ice, which could cause irreversible damage to the tissue.
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate, fentanyl and meperidine.***

Adult | Trauma | Burns

Updated 8/5/08

Chemical burns: represent a hazard to both the patient and the rescuer, and extreme care should be taken to avoid exposure to offending agents. The eyes are particularly vulnerable to chemical burns. In general, acids tend not to burn as deeply as alkalis which penetrate very deeply as the tissue is de-fatted. Therefore, eye irrigation should be started early and continued for at least 15 min.

Electrical burns: most injuries in electrical burns are internal. The heart is most susceptible to voltage below 400 volts. Above this level, internal burns are a major complication. Remember that most injuries in electrical burns are internal. Fatal arrhythmias are usually a very early problem but other arrhythmias may occur at any time if the heart has been electrically injured.

Thermal burns: cool the burn, if appropriate, maintaining normal body temperature, and protecting the airway. Shock in the very early stages of a burn is generally not associated with the burn, thus one should rule out other life-threatening injuries.

Enhanced

- Scene safety (turn off power or contact fire department, extinguish flames, wear PPE).
- Have a high index of suspicion in cases of facial burns, sooty sputum, singed facial hair, etc.
- Spinal immobilization, if indicated.
- Irrigate chemical burn site with water if appropriate to chemical (if powdered chemical, brush off).
- Apply *dry* sterile dressings.
- Splint fractures (after applying dressing).
- Fluid **bolus of 500 mL NS IV up to 1 liter** if indicated for hypotension, to maintain a SBP >90 mmHg.
- Avoid establishing IV distal to an extremity burn site. Maintain a SBP >90 mmHg.

Medic

- For moderate to severe pain and a SBP> 90, **morphine sulfate 2-10 mg IV** (at no greater than 3 mg/min), or **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**. **Medical Command** can be contacted for additional orders.
- Consider pain management using patient inhaled **nitrous oxide**.
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl >250 mcg**
- Before giving **morphine/fentanyl** to multisystem trauma patients.
- For **meperidine 50-100 mg IV/IO only** if patient is allergic to morphine and fentanyl.

Considerations

- In electrical burns, search for additional traumatic injury.
- In thermal burns, assess the patient for evidence of potential carbon monoxide exposure.
- Remove jewelry and non-adherent clothing.
- Estimate extent of burns (area of palm =1%)
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate, fentanyl, and meperidine.***

Adult | Trauma | General Management

Updated 8/5/08

The general initial assessment and management of a traumatically injured adult and child are essentially the same. Airway and breathing must be evaluated and managed first, followed by assessment of circulation, then a brief neurological examination and complete exposure of the patient. One of the most important responsibilities of the prehospital provider is to spend as little time on the scene to evaluate the patient. Perform life saving measures and prepare the critically injured patient for transport. Many procedures and assessments can be done enroute to the hospital where definitive care resides for the trauma patient.

Enhanced

- Spinal immobilization, if indicated
- **IV bolus of 500 mL NS up to 1 liter** if necessary to maintain a SBP >90 mmHg.
- For suspected tension pneumothorax (extreme dyspnea, hypotension, absent breath sounds) perform needle thorocostomy
- Evisceration (extrusion of internal organs outside of the protective abdominal cavity), cover with moist sterile dressing, then with plastic wrap. *DO NOT PUSH/FORCE ORGANS BACK INTO CAVITY!*
- *Notify MedCom as soon as possible if your patient meets trauma alert criteria due to mechanism of injury or clinical status of patient (red or yellow patient category). Advise MedCom of the following: 1) Mechanism of injury, 2) Age and sex of patient, 3) Sites of injury, 4) Vitals (if available), 5) ETA.*

Medic

- For moderate to severe pain from isolated extremity fracture/dislocation and a SBP> 90, **morphine sulfate 2-10 mg IV** (at no greater than 3 mg/min), or **fentanyl 50-100 mcg initially, 25-50 mcg q 15 min** thereafter, titrating to pain, **not to exceed 250 mcg total**. **Medical Command** can be contacted for additional orders.
- Consider pain management using patient controlled inhaled **nitrous oxide.**
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl >250 mcg**
- **Meperidine 50-100 mg IV/IO only** if patient is allergic to morphine and fentanyl.
- Before giving **morphine/fentanyl** to multisystem trauma patients.
- Consider cessation of resuscitation efforts for patients in cardiac arrest post-traumatic event.

Considerations

- Difficulty breathing or moving? Loss of sensation? Any bruising noted on chest or back? Any penetrating injuries near or around spinal cord?
- If shooting/stabbing/chest trauma: number of punctures and location(s). Tracheal deviation? Subcutaneous air? Breath sounds?
- Traumatically injured patients are very susceptible to heat losses and preservation of body heat is paramount: keep the patient warm unless already hyperthermic.
- If CNS injury, consider elevating the head of the stretcher to 30°.
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate, fentanyl, and meperidine.***

Pediatric | Allergic Reaction

Severe allergic reactions are life threatening with a mortality rate of approximately 3% requiring swift action. Care is focused on reducing or stopping the allergic reaction. The cardinal signs of severe allergic reactions are stridor, bronchospasm, and hypotension and may additionally include tightness in the chest, generalized hives, hoarseness and wheezes. The symptoms associated with severe allergic reactions may begin within seconds of exposure to an allergen or may be delayed up to 1 hour. However, typical response begins within minutes of exposure and primarily involves cardiovascular and respiratory system.

Enhanced

- Safely and rapidly remove patient from source of exposure, if necessary.
- Ice packs may be applied to a local exposure (i.e., bee sting).
- **Epinephrine 1:1,000 0.01 mg/kg SQ** if patient is in extremis (e.g., unable to speak, absent breath sounds, hypotension, has poor perfusion). **Max dose 0.3 mg.**
- **Albuterol 2.5 mg** for bronchospasm. May **repeat albuterol PRN.**
- If patient is hypotensive (SBP <90 mmHg), consider **20 mL/kg IV NS**.
- **Diphenhydramine 1 mg/kg IV/IM max dose 50 mg** for mild to severe reactions.
- **Methylprednisolone 2 mg/kg IV over 1 min, max 125 mg** for severe hives or difficulty breathing.

Contact Medical Command

- For additional **epinephrine** dosing.

Considerations

- *Any patient receiving epinephrine in the field should be transported.*

Pediatric | Cardiac | CODE

Pediatric cardiac arrest or pre-arrest states should be approached by addressing airway management and ventilation first, since these are the most likely cause of the arrest or pre-arrest state. Special considerations such as maintaining body temperature, frequent re-assessment, and rapid transport should be observed in each of these cases.

Enhanced

- Assess airway for patency, obstruction or foreign body.
- Check adequacy of any bystander CPR and take over if indicated. Perform chest compressions if, despite oxygenation and ventilation, there is a persistent HR <60.
- If patient is pulseless and apneic, use AED. Pediatric pads are preferred but adult pads may be used if needed.
- Obtain blood glucose measurement. If hypoglycemia is suspected, treat with **dextrose,** see Pediatric ALOC protocol for dosage, or with **glucagon 1 mg IM** if IV access is not available.
- Maintain body temperature, expose only as needed to assess and treat.

Medic

- Refer to rhythm-specific protocol.
- Consider nasal/orogastric tube placement for abdominal distension.

Considerations

- CPR should be hard and fast at a rate of 100.
- IV medications should be followed by 10 cc bolus of fluid to move drugs into central circulation. Include boluses in recorded volume resuscitation totals.
- ET dosing of medications is less desirable than IV or IO administration. All ET doses of medication should be flushed with 2-3 mL of normal saline.
- Proper ETT position should be reconfirmed every time the patient is moved, or there is a change in patient status. Continuous monitoring of ETCO2 is indicated in intubated pediatric patients.
- Use length-based resuscitation calculator/tape (such as Broselow tape) for age/weight-appropriate medication dosing.
- Intraosseous access should only be attempted in a patient who is unresponsive to pain.

Pediatric | Cardiac | Asystole/PEA

Medic

- **Epinephrine repeated every 3-5 min**
  - **IV/IO: 0.01 mg/kg (1:10,000; 0.1 mL/kg) max dose 1 mg**
  - **ET: 0.1 mg/kg (1:1000; 0.1 mL/kg) max dose 10 mg**

- Identify and treat causes:
  - Hypovolemia – **20 mL/kg IV NS bolus**
  - Hypoxia – **high-flow oxygen**
  - Hydrogen ion (Acidosis)*
  - Hyperkalemia (known or suspected)*
  - Hypoglycemia – **Dextrose**
  - Hypothermia – Active rewarming, refer to specific protocol
  - Toxins*
  - Tamponade, cardiac*
  - Tension pneumothorax – Needle thoracostomy
  - Thrombosis (coronary or pulmonary) – **20 mL/kg IV NS bolus**

Contact Medical Command

- *For specific treatment for any of the above causes

Pediatric | Cardiac | Bradycardia

Hypoxemia, hypotension, and acidosis interfere with the normal function of the sinus node and AV junctional tissue, causing slow conduction through normal pathways. Sinus bradycardia, sinus node arrest with a slow junctional or ventricular escape rhythm, and various degrees of AV blocks are the most common pre-arrest rhythms in children. Bradycardia (HR <60 bpm in infants/children and <100 bpm in neonates) associated with poor systemic perfusion should be treated in any infant or child, even if the BP is normal. Adequate ventilation with 100% oxygen must be ensured, chest compressions performed, and epinephrine and atropine administered, when indicated.

Medic

- 12-lead ECG
- If symptomatic, **epinephrine IV/IO: 0.01 mg/kg (1:10,000; 0.1 mL/kg) every 3-5 min up to 1 mg**, or **ET: 0.1 mg/kg (1:1000; 0.1 mL/kg) max dose 10 mg.**
- **Atropine sulfate IV/IO: 0.02 mg/kg, minimum dose 0.1 mg.**
  - **Max child single dose 0.5 mg; total dose 1 mg.**
  - **Max adolescent single dose 1.0 mg; total dose 2 mg.**
- Consider **TCP**: beginning at a rate of 100-120 and a mA of 0 and dial up until capture is made.

Considerations

- Sinus Bradycardia is a common manifestation of hypoxia in the infant. The older child may present with specific symptoms such as syncope, chest pain, shortness of breath, or palpitations.

Pediatric | Cardiac | Tachycardia/PSVT

By far the most common arrhythmia seen in the pediatric age is paroxysmal supraventricular tachycardia (PSVT), which may occur in all age groups but is most common in infancy. Presentation in infancy is characterized by poor feeding, rapid breathing, or irritability. The infant may appear very ill and be misdiagnosed with sepsis. The diagnosis of PSVT is suspected in the child who presents with a heart rate between 200 and 300 bpm. CHF may be present. Wide-complex tachycardia is presumed to be ventricular in origin, since PSVT with aberration is extremely rare in children.

Medic

- Obtain-12 lead ECG.
- If QRS duration normal, <0.08 seconds, continue. If not, see Ventricular Tachycardia protocol.

Probable Sinus Tachycardia

- P waves present and normal.
- Variable R-R with constant P-R.
- Infants: HR usually <220
- Children: HR usually <180
- Identify and treat possible causes:
  - Hypoxemia – high-flow oxygen
  - Hypovolemia - **20 mL/kg IV NS bolus**
  - Hyperthermia*
  - Hyper/hypokalemia and metabolic disorders*
  - Tamponade*
  - Tension Pneumothorax – needle thoracostomy
  - Toxin/poisons/drugs*
  - Thromboembolism*
  - Pain*

Probable PSVT

- QRS duration normal, <0.08 seconds:
- P waves absent or normal.
- Abrupt rate change to or from normal.
- Infants: HR usually >220
- Children: HR usually >180

Contact Medical Command

- *To treat above causes
- Consider vagal maneuvers
- **Adenosine IV/IO 0.1 mg/kg rapid bolus ,max first dose 6 mg. Max second dose 12 mg**
- **Synchronized cardioversion 0.5 to 1.0 J/kg**, may increase to **2 J/kg** if initial dose is ineffective.
- Consider sedation with **midazolam 0.1 mg/kg, max single dose 2 mg**, but do not delay cardioversion

Pediatric | Cardiac | VF/VT Arrest

Medic

- Attempt **defibrillation, 2 J/kg**.
- **Epinephrine every 3-5 min**
  - **IV/IO: 0.01 mg/kg (1:10,000; 0.1 mL/kg) max dose 1 mg**
  - **ET: 0.1 mg/kg (1:1,000; 0.1 mL/kg) max dose 10 mg**

- Attempt **defibrillation @ 4 J/kg** after 2 min of CPR.
- After 3 CPR/defibrillation cycles
  - Consider **amiodarone 5 mg/kg IV/IO, max 300 mg** for refractory VF/VT

Contact Medical Command

- **Magnesium sulfate 25-50 mg/kg IV/IO** for torsade de pointes, **max dose 2 g**.

Considerations

- Acidosis in children is primarily a problem of ventilation and oxygenation. Sodium Bicarbonate should *not* be used during brief resuscitation episodes.
- When utilizing AED's, use equipment with pediatric pads whenever possible, but adult pads are an acceptable alternative.

Pediatric | Cardiac | VT (with a pulse)

VT is uncommon in the pediatric age group. In the presence of VT, the ventricular rate may vary from near normal to more than 400 beats per min. Slow rates may be well tolerated, but rapid ventricular rates compromise stroke volume and cardiac output and may degenerate into VF. The majority of children who develop VT have underlying structural heart disease or prolonged QT syndrome.

Medic

- Obtain 12-lead ECG
- VT is probable if QRS is wide (QRS duration >0.08 seconds) in the presence of tachycardia.
- **Synchronized cardioversion** is indicated immediately in the unstable patient **0.5 to 1.0 J/kg**, if not effective, **increase to 2 J/kg**

Contact Medical Command

- Consider **amiodarone 5 mg/kg IV over 10 minutes, max 150 mg.**
- Consider sedation with **midazolam 0.1 mg/kg** but do not delay cardioversion
- **Nitrous oxide** for pain control if **age >12.**

Considerations

- When utilizing AED's, use equipment with pediatric pads and sensing ability whenever possible, but use adult units if pediatric units/pads not available.

Pediatric | Environmental | Hyperthermia

Heat cramps are painful cramps or spasms of large muscle groups encountered during exertion in hot environments.

Heat Exhaustion is a syndrome of dizziness, nausea, vomiting, weakness, and, occasionally syncope which may be associated with a normal body temperature or a moderate temperature elevation. There is no sustained change in mentation, and the skin is usually wet from profuse diaphoresis.

Heat Stroke is the most severe form of heat illness. Patients with heat stroke present with disorientation, seizures, and/or coma. Historically, heat stroke was defined as the triad of hyperpyrexia (temperature >105 F), CNS dysfunction, and lack of sweating. However, lack of sweating is not an absolute diagnostic criterion since many heat stroke patients may present with profuse sweating.

Enhanced

- Obtain accurate body temperature, if possible (rectal preferred).
- Move to cooler environment and remove excess clothing.

- **Heat Exhaustion**: Carefully begin hydration with oral isotonic solutions or water, if patient can tolerate liquids. Do not give large amounts of fluid rapidly or administer fluids by mouth to any patient who has an altered mentation.
  - If temperature >103 F (39.4 C), cool patient with ice packs, cool wet towels, or fans and spray water applied to areas where major vessels come close to the skin surface, (i.e., carotids, femorals, brachials).
  - Remove cooling agent when temperature reaches 100 F (37.7 C). to avoid too rapid of a temperature drop which may initiate the shivering process (which will increase temperature).
  - Fluid bolus therapy **20 mL/kg IV NS** with evidence of hypovolemia or hemodynamic compromise, or severe heat cramps with painful, involuntary muscle spasms.

- **Heat Stroke**: Aggressive evaporation cooling is indicated (using fine mist water spray and forced air stream with fans), apply ice packs to groin and axillae.
  - Continue cooling until core temperature <104 F (40 C) to avoid too rapid of a temperature drop or shivering begins (which will increase temperature).
  - Fluid bolus therapy initially at **20 mL/kg of NS**. If evidence of hypovolemia or hemodynamic compromise exists, then repeat fluid therapy at **20 mL/kg IV bolus.**

Considerations

- The major difference between heat exhaustion and heat stroke is generally CNS impairment.
- The treatment of heat exhaustion is rest with fluid volume and electrolyte replacement.
- Dehydration and volume depletion may not occur in classic heat stroke. Vigorous fluid administration may produce pulmonary edema, especially in the very young.
- ***Max fluid volume is 40 ml/kg*** *in both cases (monitor for signs and symptoms of fluid overload).* Fluid boluses should be given over 10-15 min max.

Pediatric | Environmental | Near Drowning

Drowning is the fourth most common cause of trauma related death in the United States. It can occur anywhere from a residential bathroom to area lakes. Near Drowning is defined as a submersion accident with recovery of vital signs and survival greater than 24 hours post incident. The primary mechanism of death in drowning is hypoxia and suffocation due to lack of oxygen or atelectasis of lung tissue. Patient survival is based largely on early access, aggressive management and resuscitation intervention.

Enhanced

- Remove from water if so trained, and it is safe to do so**.**
- Spinal immobilization, if indicated.
- Obtain a core temperature, treat for hypothermia.
- If patient is hypotensive (SBP <90 mmHg), consider **IV 20 mL/kg NS bolus** and reassess.

Medic

- Refer to specific protocol for cardiac arrhythmias or if patient is in cardiac arrest, as indicated.

Considerations

- Type of incident (surface impact, submerged object strike, propeller trauma).
- If submerged, how long under and how deep?
- Weather conditions, water temperature, temperature at depth discovered (if SCUBA recovery).
- Hypothermic patients have slowed uptake and circulatory functions and are candidates for prolonged resuscitation efforts and transport to hospital. Follow “Hypothermia” protocol if immersion is in water.
- *Patient should be seen by physician – near drownings can cause respiratory compromise hours after the initial incident.*

Pediatric | Neurological | ALOC

Altered mentation is a symptom, not a diagnosis, with many possible causes, both medical and traumatic. Common etiologies include: diabetic problems (hypo/hyperglycemia), alcohol or drug intoxication, metabolic abnormalities, seizures or postictal states, toxic exposure, hypoxia, sepsis, stroke, and head trauma. Altered mentation of a known etiology (such as hypoglycemia or narcotic overdose), should be treated using the appropriate protocol. Multiple patients with an altered mentation suggest toxic exposure/drug ingestion (always remember CO).

Enhanced

- Blood glucose assessment.
- Spinal immobilization, if indicated.
- Administer Glucose:
  - **CHILDREN (age <8 years):**
    - **D50 1mL/kg slow IV/IO, repeat if needed.**
  - **INFANTS (age >1 month):**
    - **D25 2mL/kg slow IV/IO, repeat if needed.**
  - **NEONATES (age <1 month):**
    - **D12.5 4mL/kg slow IV/IO, repeat if needed.**
- If unable to establish venous access, administer **glucagon 1 mg IM**.
- **Evidence of dehydration:**
  - **20 mL/kg IV bolus** for hypoperfusion, tachycardia, or mild signs and symptoms of dehydration (mildly sunken fontanels, poor turgor, minimally tachycardic). **Max of 40 mL/kg**
- If suspect narcotic overdose, then **naloxone 0.1 mg/kg IV/IO/IM**. *If intubated, the patient should not receive naloxone.*

Considerations

- *Contact Poison Control prior to or during transport if known product/poisoning suspected (800-451-1428). Treat the physician as Medical Command.*
- Sepsis with fever, hypothermia, or hypoxia may be some causes for altered mental status in children.
- Is there a medical history that suggests a possible cause (i.e., cardiac history, diabetes, CVA, HTN, seizures, or alcohol/drugs)? *Is the patient a newborn of a narcotic-abusing mother?*
- Any evidence of trauma?
- Is the patient under a physician's care for this condition?

Pediatric | Neurological | Seizures

Seizures are defined as an episode of abnormal neurologic function caused by an abnormal electrical discharge of brain neurons. There are many episodic disturbances of neurological function that can mimic a seizure.

Status Epilepticus is a true medical emergency defined as either continuous seizures lasting at least 5 min or two or more discrete seizures, without complete recovery of consciousness in-between.

Enhanced

- Protect the actively seizing patient. Do not attempt to restrain.
- Check blood sugar and administer **dextrose IV/IO** at appropriate dose for age for persistent seizures, or suspected hypoglycemia. Follow ALOC protocol.
- **Administer glucagon 1 mg IM** if IV attempts are unsuccessful.

Medic

- Initiate ECG monitoring
- Administer **lorazepam 0.1 mg/kg IV, max 2-4 mg**. If unable to establish venous access, administer **midazolam 0.1 mg/kg IM, max 5 mg** for persistent seizures.

Contact Medical Command

- For repeat dosing of **lorazepam or midazolam**
- For **diazepam 0.1 mg/kg IV** if patient is allergic to **lorazepam/midazolam**

Pediatric | OB/GYN | Newborn Resuscitation

The vast majority of term newborns require no resuscitation beyond maintenance of temperature, suctioning of the airway, and mild stimulation. Most neonatal resuscitations in the prehospital setting occur without prior notice. Prehospital delays should always be kept to a minimum when possible.

Enhanced

- Assess responsiveness, breathing, and pulse (by palpating base of umbilical cord, brachial or femoral artery, or auscultation of apical heart sounds. Record delivery when patient status allows.
- Place the newborn on his/her back with the neck in a neutral position to avoid hyperextension or flexion of the neck.
- If meconium staining is present, suction the mouth with bulb suction as best as possible before suctioning the nose, or provide ventilations. If meconium is observed during delivery, you must suction prior to the delivery of the body.
- After delivery, use mild stimulation (drying, warming, and suctioning) as needed. If spontaneous and effective respirations are not established after 5 to 10 seconds of stimulation, ventilatory assistance (40 to 60 breaths/min) with an infant BVM is required.
- If the newborn's HR <60 bpm, and it does not increase after BVM ventilation with 100% oxygen for approximately 30 seconds, chest compressions should be initiated.
- Dry the newborn, wrap in a towel, head cap, or blanket and maintain warmth. *Do not allow the newborn to become hypothermic.*
- Record APGAR scores at 1 min and 5 min of birth.

Medic

- Endotracheal intubation is indicated when:
  - BVM ventilation is ineffective
  - Tracheal suctioning is required for aspiration of thick, particulate meconium using a meconium aspirator.
- Fluid resuscitation therapy should be instituted when signs and symptoms of shock (rare) are present.
  - A **10 mL/kg IV/IO bolus of NS administered as rapidly as possible**.
  - Reassess the newborn and if signs and symptoms of shock persist, repeat bolus of **10 mL/kg NS IV/IO**.
- Follow specific algorithms in cases of bradycardia, tachycardia or cardiopulmonary arrest.
- For newborns <30 days old, **epinephrine 0.01 mg/kg ET** if medications must be used; dose does not increase.

Considerations

- All newborns have difficulty tolerating a cold environment. Depressed infants are especially at risk for complications of cold stress, and recovery from acidosis is delayed by hypothermia. Heat loss may be prevented by (1) quickly drying the amniotic fluid covering the infant; (2) removing wet linens from contact with the baby. Methods of warming include blankets, warming mattresses; warm towels and placement of towel-wrapped latex gloves filled with warm water around the infant or towel wrapped hot packs.
- IO access should be attempted if no peripheral access can be obtained after 2 attempts or 90 seconds in patients with cardiovascular collapse.
- If there is meconium, clean endotracheal tubes should be used for each successive intubation while suctioning.

Pediatric | Pulmonary | Dyspnea

Respiratory distress is a symptom from many origins including, but not limited to, hyperventilation syndrome, CHF, reactive airway disease (asthma, COPD, chronic bronchitis) and pulmonary irritation. Emphysema in the infant and child is rare, and, if present, is congenital. The goal for the prehospital provider is to accurately assess the patient, provide oxygenation and ventilatory support, and drug therapy as needed.

Enhanced

- Allow child to assume position of comfort, preferably with head elevated.
- **Albuterol 2.5 mg via nebulizer**, **repeat PRN** as long as patient remains symptomatic.
- For a patient in extremis (unable to speak normally, severe wheezing, absent or greatly diminished breath sounds, signs of poor perfusion):
  - **Epinephrine 1:1,000 at 0.01 mg/kg SQ, max single dose is 0.3 mg, repeat every 20 min for a total of 3 doses**, if still symptomatic.
- For suspected croup (barking cough, retractions, stridor, fever) or epiglottitis (stridor, drooling, hoarse voice, fever, leaning forward position), consider **nebulized saline** for mildly to moderate symptomatic patients: **2-3 ml of sterile saline in nebulizer**.
- **Methylprednisolone 2mg/kg IV, max 125 mg** for severe asthma or croup.

Contact Medical Command

- For moderate to severe patients with suspected croup/epiglottitis, place 2-3 ml **epinephrine (2-3 mg) of 1:1000 via nebulizer**.

Considerations

- In upper airway disorders (i.e., epiglottitis, croup, foreign body airway obstruction), invasive airway maneuvers should *only* be attempted if patient is in respiratory arrest, as aggravation of irritated tissues can cause further airway obstruction.

Pediatric | Toxicology | Poisoning/OD

Updated 8/5/08

It is impossible to include all potential toxic exposures or poisonings in this protocol. Management of the poisoned/overdose patient focuses on several principles; decontamination limits further absorption and minimizes the extent of toxicity; supportive care limits the effects of the serious complications of poisoning on the primary systems at risk; and definitive care limits the severity of duration of toxicity through the use of pharmacological antagonists (antidotes) or enhances elimination of the toxin itself.

Enhanced

- Scene safety (consider HazMat). Identify substance, decon patient, if trained.
- Flush skin/mucous membranes with appropriate solution, if indicated.
- Secure/protect airway as necessary
- Initiate fluid bolus if hypotension is present **20 mL/kg bolus NS IV**.

Consider drug-specific therapies:

- **Opioids** (alfentanil, buprenorphine, butorphanol, codeine, dezocine, fentanyl, heroin, hydrocodone, hydromorphone, levorphanol, meperidine*, methadone, morphine, nalbuphine, oxymorphone, oxycodone, pentazocine, propoxyphene*, remifentanil, sufentanil, tramadol*)
  *These drugs are unlikely to cause pinpoint pupils
  - For CNS depression, give **naloxone 0.1 mg/kg SLOWLY IVP** and stop when the patient is breathing adequately**.** *If intubated, the patient should not receive naloxone.*
- **Dystonic Reaction from phenothiazines or antipsychotics** (chlorpromazine, fluphenazine, haloperidol, loxapine, molindine, perphenazine, pimozide, promethazine, trifluorperazine, triflupromazine, thiothixene)
  - For spasms of the tongue, face, neck or back, and/or facial contortions, give **diphenhydramine 1.0 mg/kg slow IV push, max dose of 50 mg**.

Medic

Consider drug-specific therapies:

- **Tricyclic Antidepressant** (amitriptyline, clomipramine, desipramine, doxepin, imipramine, maprotiline, nortriptyline, protriptyline, trimiprimine)
  - For QRS >0.08 msec, hypotension not responsive to IV fluids, dysrhythmias, seizures, give **sodium bicarbonate 1 mEq/kg IV bolus over 2 min**.
- **Calcium Channel Blocker** (diltiazem, amlodipine, felodipine, isradine, nicardipine, nifedipine, nimodipine, nisoldipine, verapamil) or **Beta-blocker** (acebutolol, atenolol, betaxolol, bisoprolol, carteolol, carvedilol, labetalol, metoprolol, nadolol, penbutolol, pindolol, propranolol, timolol)
  - For bradycardia, QRS >0.08 msec, heart block, hypotension, give **calcium chloride 10 mg/kg slow IV push over 10 min**. *Do not allow extravasation, use free flowing IV, and never give in a hand vein.*
  - Transcutaneous pacing for persistent bradycardia and hypotension.
  - Consider **glucagon 0.1 mg IV** (reconstitute with normal saline, *not* packaged diluent).
- **Organophosphate** (carbamates, insecticides, herbicides, OP compounds, malathion, parathion, diazinon, fenthion, dichlovos, chlorpyrifos, most ophthalmic agents, isoflurophate, trichlorfon)
  - For SLUDGE (**S**alivation, **L**acrimation, **U**rination, **D**efecation, **G**astrointestinal upset, **E**mesis) or airway secretions, severe bronchospasm, seizures, or bradycardia, give **atropine 0.05 mg/kg doubled every 5 to 10 min (no max dose)** until signs of decreased secretions. *Tachycardia is not a contraindication to atropine administration.*

Contact Poison Control (1-800-451-1428)

- For all complicated overdoses use poison control physician as medical command, carefully document name. MedCom must still be contacted
- For **epinephrine drip 2-10 mcg/min** as alternative to dopamine for hypotension.

Pediatric | Trauma | Amputation

The partial or complete severance of a digit or a limb is an amputation. Candidates for reimplantation include victims of amputation of the scalp, hand, digit, penis, and selected portions of distal extremities.

Enhanced

- Assess the patient for associated injuries that may be of a higher priority.
- Apply direct pressure to control hemorrhage. A tourniquet should be avoided when possible. *If a tourniquet must be placed, use only the smallest amount of pressure over the widest area to achieve hemorrhage control*.
- In the case of incomplete amputation, splint entire digit or limb in a physiologic position, if possible.
- Place part in damp (not wet) gauze, place in plastic bag, wrap in trauma dressing and place on ice/water mix.
- Fluid **20 mL/kg NS IV bolus** if indicated for hypotension, to maintain a SBP >90mmHg.

Medic

- For severe pain, **morphine sulfate 0.1 mg/kg slow IV/IO/IM, max 2-10 mg** or **fentanyl in 2 mcg/kg slow IV/IO/IM, max 150 mcg** on standing order, while maintaining SBP >90.
- Consider pain management using patient inhaled **nitrous oxide if age >12**.
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl**
- Before giving **morphine/fentanyl** to multisystem trauma patients.

Considerations

- Never freeze the part by placing it directly on the ice or by adding any other coolant, such as dry ice, which could cause irreversible damage to the tissue.
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate and fentanyl.***

Pediatric | Trauma | Burns

Chemical burns: represent a hazard to both the patient and the rescuer, and extreme care should be taken to avoid exposure to offending agents. The eyes are particularly vulnerable to chemical burns. In general, acids tend not to burn as deeply as alkalis which penetrate very deeply as the tissue is de-fatted. Therefore, eye irrigation should be started early and continued for at least 15 min.

Electrical burns: most injuries in electrical burns are internal. The heart is most susceptible to voltage below 400 volts. Above this level, internal burns are a major complication. Remember that most injuries in electrical burns are internal. Fatal arrhythmias are usually a very early problem but other arrhythmias may occur at any time if the heart has been electrically injured.

Thermal burns: cool the burn, if appropriate, maintaining normal body temperature, and protecting the airway. Shock in the very early stages of a burn is generally not associated with the burn, thus one should rule out other life-threatening injuries.

Enhanced

- Scene safety (turn off power or contact fire department, extinguish flames, wear PPE).
- Have a high index of suspicion in cases of facial burns, sooty sputum, singed facial hair, etc.
- Spinal immobilization, if indicated.
- Irrigate chemical burn site with water if appropriate to chemical (if powdered chemical, brush off).
- Apply *dry* sterile dressings.
- Splint fractures (after applying dressing).
- **20 mL/kg IV/IO NS bolus** if indicated for hypotension, to maintain a SBP >90 mmHg. **Max 40 mL/kg bolus.**
- Avoid establishing IV distal to an extremity burn site. Maintain a SBP >90 mmHg.

Medic

- For severe pain, **morphine sulfate 0.1 mg/kg IV/IO/IM, max 2-10 mg** or **fentanyl 2 mcg/kg slow IV/IM/IO max 150 mcg** standing order, maintaining SBP >90.
- Consider pain management using patient inhaled **nitrous oxide to age >12**.
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl**
- Before giving **morphine/fentanyl** to multisystem trauma patients.

Considerations

- In electrical burns, search for additional traumatic injury.
- Consider early intubation if airway compromise develops from inhalation of superheated gases of smoke. Have a high index of suspicion in cases of facial burns, sooty sputum, singed facial hair, etc.
- In thermal burns, assess the patient for evidence of potential carbon monoxide exposure.
- Remove jewelry and nonadherent clothing.
- Estimate extent of burns (area of palm =1%)
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate and fentanyl.***

Pediatric | Trauma | General Management

The general initial assessment and management of a traumatically injured adult and child are essentially the same. Airway and breathing must be evaluated and managed first, followed by assessment of circulation, then a brief neurological examination and complete exposure of the patient. One of the most important responsibilities of the prehospital provider is to spend as little time on the scene to evaluate the patient. Perform life saving measures and prepare the critically injured patient for transport. Many procedures and assessments can be done enroute to the hospital where definitive care resides for the trauma patient.

Enhanced

- Spinal immobilization, if indicated
- **20 mL/kg NS bolus IV/IO** if necessary to maintain a SBP >90 mmHg or for signs of hypoperfusion.
- For suspected tension pneumothorax (extreme dyspnea, hypotension, absent breath sounds) perform needle thorocostomy
- Evisceration (extrusion of internal organs outside of the protective abdominal cavity), cover with moist sterile dressing, then with plastic wrap. *DO NOT PUSH/FORCE ORGANS BACK INTO CAVITY!*
- *Notify MedCom as soon as possible if your patient meets trauma alert criteria due to mechanism of injury or clinical status of patient (red or yellow patient category). Advise MedCom of the following: 1) Mechanism of injury, 2) Age and sex of patient, 3) Sites of injury, 4) Vitals (if available), 5) ETA.*

Medic

- For moderate to severe pain from isolated distal extremity fracture/dislocation, **morphine sulfate 0.1 mg/kg slow IV/IO/IM max 2-10 mg** or **fentanyl in 2 mcg/kg IV/IO/IM max 150 mcg** while maintaining SBP >90.
- Consider pain management using patient controlled inhaled **nitrous oxide if age >12.**
- Initiate ECG monitoring.

Contact Medical Command

- For additional **fentanyl**
- Before giving **morphine/fentanyl** to multisystem trauma patients.
- Consider cessation of resuscitation efforts for patients in cardiac arrest post-traumatic event.

Considerations

- Children are very susceptible to heat loss, preservation of heat is paramount.
- Difficulty breathing or moving? Loss of sensation? Any bruising noted on chest or back? Any penetrating injuries near or around spinal cord?
- If shooting/stabbing/chest trauma: number of punctures and location(s). Tracheal deviation? Subcutaneous air? Breath sounds?
- Traumatically injured patients are very susceptible to heat losses and preservation of body heat is paramount: keep the patient warm unless already hyperthermic.
- If CNS injury, consider elevating head of cot 30°.
- *Note: Continuous ECG, pulse oximetry and blood pressure monitoring (every 5 min) are mandatory, during, and after administration of **morphine sulfate and fentanyl.***

Adenosine (Adenocard)

Class Antidysrhythmic

Action Slows AV conduction

Indications Symptomatic supraventricular tachycardia (SVT)

Contraindications 2nd or 3rd degree heart block, sick sinus syndrome, known hypersensitivity to the drug

Precautions Arrhythmias, including blocks are common at the time of the conversion. Use with caution in patients with asthma

Side-Effects Facial flushing, headache, shortness of breath, dizziness, and nausea

Dosage 6mg given as a rapid IV bolus followed with a 20cc flush; if the patient has not converted, 12 mg followed by another 20 cc flush

Route IV, should be administered in the closest medication port to the vein

Pediatric Dosage 0.1 mg/kg

Albuterol (Proventil)

Class Beta-2 agonist

Action Bronchodilation

Indications Asthma, bronchospasm, COPD, allergic reaction

Contraindications Known hypersensitivity to the drug, symptomatic tachycardia

Precautions Monitor vital signs. Use caution in patients with known heart disease

Side-Effects Palpitations, anxiety, headache, dizziness, and sweating

Dosage
Dyspnea: 2.5 mg in nebulizer
Hyperkalemia: 2.5 mg ETT

Route Nebulizer

Pediatric Dosage Same as adult

Amiodarone (Cordarone)

Class Type III Antidysrhythmic

Action Prolongs myocardial action potential, causes noncompetitive alpha and beta-adrenergic blockade, suppresses atrial and ventricular ectopy, slows conduction through AV node

Indications VF/VT/SVT

Contraindications CHF, bradycardia, AV block, hypersensitivity

Precautions Use caution during pregnancy and patients who take digitalis, beta blockers, and calcium channel blockers

Side Effects Dizziness, HA, bradycardia, hypotension

Dosage
VT/SVT with pulse: 150 mg over 10 minutes
VT no pulse: 300 mg IVP

Route IV/IO

Pediatric Dosage 5 mg/kg over 10-20 minutes

Aspirin

Class Non-steroidal anti-inflammatory drug (NSAID)

Action Inhibits cyclooxygenase and thromboxane A2, thereby inhibiting platelet aggregation

Indications Chest pain of a suspected cardiac origin

Contraindications Hypersensitivity or true aspirin allergy

Precautions Peptic ulcer disease and bleeding disorders

Side Effects Bleeding, gastric distress (nausea, vomiting, heartburn), renal impairment

Dosage 324 mg

Route PO

Pediatric Dosage **Call Medical Command**

Atropine

Class Parasympatholytic (anticholinergic)

Action Blocks acetylcholine receptors, increases heart rate

Indications Bradycardia, hypotension secondary to bradycardia, asystole, organophosphate poisoning

Contraindications None when used in emergency situations

Precautions Caution in renal patients, patients with cardiac disease, patients on digitalis, patients in respiratory acidosis and failure

Side-Effects Extravasation causes necrosis; dysrhythmias, hypotension, CNS changes

Dosage
Cardiac: 1mg
Symptomatic organophosphate poisoning: 0.05 mg/kg

Route Slow IV/IO

Pediatric Dosage 0.02 mg/kg

Calcium Chloride 10%

Class Electrolyte

Action Replaces and maintains cellular calcium ions

Indications Used for calcium channel blocker toxicity, reverse adverse effects of IV magnesium sulfate

Contraindications VF, digitalis toxicity, hypercalcemia

Precautions Caution in renal patients, patients with cardiac disease, patients on digitalis, patients in respiratory acidosis and failure. If the same IV line will be used for sodium bicarbonate, the line must be flushed first.

Side-Effects Extravasation causes necrosis; dysrhythmias, hypotension, CNS changes

Dosage
Hyperkalemia/Calcium Channel Blocker/Beta Blocker OD: 20 mg/kg
Reverse magnesium adverse effects: **Medical Command Only** 1 g IV/IO

Route Slow IV/IO over 10 minutes

Pediatric Dosage 10 mg/kg

Captopril (Capoten) New 8/5/08

Class ACE Inhibitor

Action Angiotensin converting enzyme (ACE) converts angioitensin I to angiotensin II and is a very important enzyme in the body's maintenance of blood pressure. When ACE is inhibited, vasodilation occurs, causing a profound reduction in afterload on the heart.

- Vasodilatation begins within 5 to 15 minutes after sublingual Administration
- Peak effect occurs in 30-120 minutes
- Duration of action is usually 3-4 hours

Indications Respiratory distress from Pulmonary Edema or Congestive Heart Failure

Contraindications Known hypersensitivity, known history of angioedema, pregnancy, renal failure

Side Effects Angioedema, hyperkalemia, renal impairment, cough, rash

Dosage 25 mg for moderate and severe dyspnea with SBP ≥140 after nitroglycerin administration

Route Sub-lingual

Pediatric dosage Not indicated

Dextrose 50% (D50)

Class Carbohydrate

Action Elevates blood-glucose level

Indications Hypoglycemia, coma of unknown origin, seizures

Contraindications None in the emergency setting

Precautions Ensure line patency before administration, extravasation causes necrosis

Side-Effects Local venous irritation

Dosage 25 g (50ml)

Route IV/IO

Pediatric Dosage 0.5-1 g/kg slow IV of a reduced D25 solution, should be diluted 1:1 with sterile water to form a 25% solution

Diazepam (Valium)

Class Benzodiazepine

Action Anticonvulsant, skeletal muscle relaxant, sedative

Indications Generalized seizures, status epilepticus, prevention of seizures in patients with DT's

Contraindications Patients with a history of hypersensitivity to the drug

Precautions Can cause local venous irritation

Side-Effects Drowsiness, hypotension, respiratory depression, apnea

Dosage **Call Medical Command for orders, first-line benzodiazepine is lorazepam**

Route IV/IO

Pediatric Dosage **Call Medical Command**

Diphenhydramine (Benadryl)

Class Antihistamine (anticholinergic)

Action Blocks histamine receptors, has some sedative effects

Indications Anaphylaxis, allergic reactions, dystonic reactions due to phenothiazines

Contraindications Asthma, nursing mothers

Precautions Hypotension

Side-Effects Sedation, decreases bronchial secretions, blurred vision, headache, palpitations

Dosage
Allergic/dystonic reaction: 25-50 mg
Chemical restraint: 12.5 mg IV or 25 mg IM

Route Slow IV/IO/IM

Pediatric Dosage 1 mg/kg

Dopamine (Intropin)

Class Sympathomimetic

Action Increases cardiac contractility causes peripheral vasoconstriction

Indications Cardiogenic shock, hypovolemic shock refractory to fluid resuscitation

Contraindications Pheochromocytoma (epi-secreting tumor), tachydysrhythmias, VF

Precautions Severe tachydysrhythmias, VF, ventricular irritability

Side-Effects Ventricular tachydysrythmias, hypertension

Dosage 5-20 mcg/kg/minute (400 mg in 250 mL of D5W). In hypotension secondary to anaphylaxis, medical command must be contacted.

Route IV/IO drip

Pediatric Dosage **Call Medical Command**

Dopamine Infusion Chart (60 gtt/mL set)
Dose 5-20 mcg/kg/min (concentration 400 mg in 250 mL)

Weight		mcg/kg/min			
kg	**lbs**	**5**	**10**	**15**	**20**
		Rate (gtts/min)			
40	88	8	16	24	32
45	99	9	18	27	36
50	110	10	20	30	40
55	121	11	22	33	44
60	132	12	24	36	48
65	143	13	26	39	52
70	154	14	28	42	56
75	165	15	30	45	60
80	176	16	32	48	64
85	187	17	34	51	68
90	198	18	36	54	72
95	209	19	38	57	76
100	220	20	40	60	80
105	231	21	42	63	84
110	242	22	44	66	88

Epinephrine 1:1,000

Class Sympathomimetic

Action Bronchodilation

Indications Broncospasm, exacerbation of COPD, allergic reaction, cardiac arrest

Contraindications Patients with underlying cardiovascular disease, hypertension, pregnancy, tachydysrhythmias

Precautions Blood pressure, pulse, and ECG must be monitored

Side-Effects Palpitations, tachycardia, anxiety, headache, tremor

Dosage
Severe allergic reaction: 0.3 mg SQ, repeat x 1 in 10 min
Asthma: **Medical Command only during asthma** 0.3 mg SQ, repeat x 1 in 10 min

Route SQ

Pediatric Dosage 0.01 mg/kg
Suspected Croup/epiglotitis: **Medical Command only** 2-3 mg via nebulizer

Epinephrine 1:10,000

Class Sympathomimetic

Action Increases heart rate, increases cardiac contractility, causes bronchodilation

Indications Cardiac arrest, severe anaphylactic shock

Contraindications None when used in the situations listed above

Precautions Should be protected from light, can be deactivated by alkaline solutions

Side-Effects Tachydysrhythmias, palpitations

Dosage
Cardiac arrest: 1 mg q 3-5 min
Allergic reaction: **Medical Command only** 0.5-1.0 mg IV over 5 min for epi SQ-refractory wheezing
Hypotension: **Medical Command Only** 2-10 mcg/min (mix 1 mg in 250 mL NS creating a concentration of 4 mcg/mL)

Route IV/ET/IO

Pediatric Dosage 0.01 mg/kg initial dose

Epinephrine Infusion Chart

Dose 2-10 mcg/min (concentration 1 mg in 250 mL)

Dose	Rate (gtts/min)
2	30
3	45
4	60
5	75
6	90
7	105
8	120
9	135
10	150

Etomidate (Amidate)

Class General anesthetic

Action Hypnotic

Indications Induction of general anesthesia

Contraindications Known hypersensitivity to drug

Precautions Caution during lactation

Side-Effects Myoclonic skeletal muscle movements, tonic movements, apnea of short duration, laryngospasm, hyper/hypotension, tachycardia, bradycardia, dysrhythmias

Dosage 0.3 mg/kg over 30 seconds

Route IV/IO

Pediatric Dosage **Call Medical Command**

Fentanyl (Sublimaze) Updated 8/5/08

Class Synthetic opioid analgesic

Action Decreases sensitivity to pain; a CNS depressant with rapid onset (30 s - IV, 7 min - IM) and moderate duration (30-60 min)

Indications Pain control and sedation during RSI, SBP >90

Precautions CNS depression, Pregnancy category C, use of MAOIs (isocarboxazid, phenelzine, tranylcypromine), significant hypotension, chest wall rigidity

Contraindications Hypersensitivity to the medication, uncorrected shock, undiagnosed abdominal pain, CHF

Side Effects Respiratory depression, CNS depression, dizziness, chest wall rigidity (occurs with rapid administration), miosis, nausea/vomiting

Supply 50 mcg/mL (5 mL ampule x 2)

Dosage

Pain: 50-100 mcg initially, 25-50 mcg q 15 minutes thereafter, titrating to pain, not to exceed 250 mcg total. **Medical Command** can be contacted for additional orders above 250 mcg.

Post-sedation: 2 mcg/kg initially, 0.5-1.0 mcg/kg q 15 minutes thereafter, titrating to airway status, level of sedation, and SBP >90.

Route Slow IV/IO/IM

Peds Dosage 2 mcg/kg **Call Medical Command for additional orders**

Glucagon

Class Hormone

Action Causes breakdown of glycogen to glucose, inhibits glycogen synthesis, elevates blood glucose level, increases cardiac contractile force, increases heart rate

Indications Hypoglycemia, coma of unknown origin (without IV access)

Contraindications Hypersensitivity to the drug

Precautions Only effective if there are sufficient stores of glycogen within the liver. Use with caution in patients with cardiovascular or renal disease

Side-Effects Few in emergency situations

Dosage 1 mg

Route IM

Pediatric Dosage 1 mg

Haloperidol (Haldol)

Class Butyrophenone typical antipsychotic

Action Sedation and chemical restraint caused by the blockade of dopamine (D_2), histamine (H_1), parasympathetic (muscarinic), and alpha-1 adrenergic receptors

Indications Violent behavior where a patient is a danger to self or others, and transport to the ED is medically necessary

Contraindications Known hypersensitivity, CNS depression, pregnancy, Parkinson's disease

Precautions Neuroleptic malignant syndrome (NMS), orthostatic hypotension, sedation, seizures, and dysrhythmias (long QT syndrome)

Side-Effects Extrapyramidal symptoms (EPS)

Dosage 5 mg IV or 10 mg IM

Route IM/IV

Pediatric Dosage **Call Medical Command**

Ipratropium Bromide (Atrovent)

Class Anticholinergic

Action Bronchodilation

Indications Bronchospasm related to asthma, chronic bronchitis, emphysema, and adult allergic reaction.

Contraindications Known hypersensitivity to the drug, symptomatic tachycardia

Precautions Monitor vital signs

Side-Effects Dry mouth, nausea, anxiety, cough, palpitations

Dosage 0.5 mg to be mixed with 2.5mg of Albuterol

Route Nebulizer/inhalation

Pediatric Dosage None

Lorazepam (Ativan)

Class Benzodiazepine

Action Anticonvulsant, skeletal muscle relaxant, sedative

Indications Generalized seizures, status epilepticus, acute alcohol withdrawal and prevention of seizures in patients with DT's

Contraindications Patients with a history of hypersensitivity to the drug

Precautions Can cause local venous irritation, push slowly

Side-Effects Drowsiness, hypotension, respiratory depression, apnea

Dosage
Seizures/agitation: 2-4 mg
Chemical restraint: 1 mg IV or 2 mg IM

Route IV/IO/IM

Pediatric Dosage 0.1 mg/kg

Magnesium Sulfate

Class Antidysrhythmic, smooth muscle relaxant, anticonvulsant

Action Alters calcium transport into the cells

Indications Refractory VT or SVT, severe asthma, eclampsia

Contraindications None

Precautions None

Side-Effects Flushing, nausea, weakness, paralysis, hypotension, dysrhythmias

Dosage Dose in 100 mL bag of NS, run in wide open with 60 drop set
Refractory VF/torsade de pointes/asthma: 1-2 g
Eclampsia: **Medical Command Only** 2-4 g until seizure stops or a maximum dose of 4 grams have been given

Route IV/IO

Pediatric Dosage
Torsades de pointes: 25-50 mg/kg (max 2 g)

Meperidine (Demerol)

Class Synthetic opioid analgesic

Action Powerful CNS depressant, peripheral vasodilation, decreases sensitivity to pain

Indications Severe pain

Contraindications Patient's taking MAOIs (isocarboxazid, phenelzine, tranylcypromine) or SSRIs (citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline)

Precautions None

Side-Effects CNS depression

Dosage **Do not use unless ordered by Medical Command (i.e., during morphine and fentanyl allergy ONLY)** 50-100 mg

Route IV/IM

Pediatric Dosage **Call Medical Command**

Methylprednisolone (Solu-medrol)

Class Steroid

Action Anti-inflammatory

Indications Anaphylaxis, asthma, COPD

Contraindications None in anaphylaxis; systemic fungal infections; pregnancy

Precautions None

Side-Effects CHF, HTN, seizures, nausea, vomiting, dysrhythmias

Dosage 125 mg

Route IV/IO

Pediatric Dosage 2.0 mg/kg

Metoprolol Updated 8/5/08

Class Beta-1 adrenergic blocker

Action Slows heart rate and lowers blood pressure

Indications Acute MI, cardiac chest pain, AF/Flutter prior to cardioversion

Contraindications CHF, wheezing, bradycardia, hypotension, 2nd/3rd degree AV block

Precautions Administer slowly, heart rate must be above 80 and blood pressure must be above 120 systolic

Side-Effects Dizziness, lethargy, bradycardia

Dosage
Chest pain/AMI: **Medical Command Only**, 5mg every 5 minutes up to 15mg
Rate control in A-fib: above dose

Route IV/IO slowly

Pediatric Dosage None

Midazolam (Versed)

Class Short-acting benzodiazepine

Action CNS depressant

Indications Sedation

Contraindications Shock, coma, ETOH, hypersensitivity

Precautions Administer slowly, respiratory illness

Side-Effects Over-sedation, amnesia, nausea, apnea, hypotension

Dosage
Seizures: 2 mg IV, 5 mg IM (Max dose 0.1 mg/kg)
Sedation in RSI: 0.1 mg/kg
Sedation in chemical restraint if age ≥65: 1 mg IV or 2 mg IM

Route IM/IV/IO slowly

Pediatric Dosage 0.1 mg/kg

Morphine

Updated 8/5/08

Class Opioid analgesic

Action CNS depressant, peripheral vasodilation, decreases sensitivity to pain

Indications Severe pain, cardiac chest pain, CHF, pulmonary edema

Contraindications Head injury, volume depletion undiagnosed abdominal pain, hypersensitivity to drug

Precautions CNS depression. Recent studies have shown that morphine might increase the possibility of a poor outcome when given to chest pain/ACS/CHF patients, yet no study has conclusively proven this as fact. Use caution when choosing patients to whom morphine is given. Only give it to those who have a stable BP and are experiencing *excruciating* pain.

Side-Effects Dizziness, altered LOC

Dosage
Chest pain: 2-6 mg
Pulmonary edema: 2-4 mg
Pain management: 2-10 mg

Route IV/IO/IM

Pediatric Dosage 0.1 mg/kg

Naloxone (Narcan)

Class Opioid antagonist

Actions Binds to opioid receptor sites

Indications Suspected narcotic overdose

Contraindications Intubated opioid-intoxicated patients

Precautions Patient may become combative following administration and effects may wear off during long transports

Side Effects Withdrawal syndrome

Dosage 0.8 mg

Route IV/IM/IO

Pediatric Dosage 0.1 mg/kg

Nitroglycerin

Class Vasodilator

Action Vasodilates venous blood vessels

Indications Chest Pain of suspected cardiac origin, CHF, pulmonary edema

Contraindications Hypotension, trauma, Intracranial hemorrhage

Precautions Hypotension

Side-Effects Headache, hypotension, and dizziness

Dosage 0.4 mg SL, 1" (15 mg) paste transdermal

Route Transdermal, sublingual

Pediatric Dosage None

Nitrous Oxide (Nitronox)

Class Inhaled anesthetic/analgesic

Action CNS depressant with rapid onset (1 min) and a short duration (3-5 min)

Indications Rapid/brief pain relief from trauma/burns, EZ-IO insertion, cardioversion Use prior to IV insertion and/or transport in the ambulance

Precautions Use in a well ventilated area **Do Not Use in the Back of the Ambulance**

Contraindications Abdominal or chest trauma, ALOC , shock , pregnancy , CHF

Dosage 50% nitrous oxide and 50% oxygen self-administered

Route Patient controlled inhalation by face mask/mouth piece

Side Effects Nausea, vomiting, confusion, mild sedation, euphoria

Pediatric Dosage **Call Medical Command**

See Nitrous Oxide Guideline for specific information

Ondansetron (Zofran) Updated 8/5/08

Class Antiemetic

Action It is a selective serotonin 5-HT_3 receptor antagonist, decreasing nausea

Indications Nausea, vomiting

Contraindications Hypersensitivity

Precautions Use with caution in patients with severe hepatic impairment

Side Effects Most common are constipation, diarrhea, fever, and headache (seen more often in chronic use)

Dosage Adult 8 mg IV over 30 seconds to 5 minutes.

Route IV/IO/IM

Pediatric Dosage 0.1 mg/kg up to 20 kg child - >20 kg child, give adult dose.

Promethazine (Phenergan)

Class Phenothiazine antiemetic

Action Antagonizes dopamine$_2$ and histamine receptors in the CNS, decreasing nausea

Indications Nausea, vomiting

Contraindications hypersensitivity

Precautions Causes sedation and use caution in the elderly

Side-Effects Extapyramidal symptoms (EPS), anticholinergic symptoms, hypotension, sedation

Dosage **Call Medical Command for orders (i.e., allergy to ondansetron in nausea or benedryl in allergic reaction)** 12.5-25 mg

Route IV/IM

Pediatric Dosage **Call Medical Command**

Sodium Bicarbonate

Class Alkalinizer

Action Restores buffering capacity of the body and neutralizes excess acid

Indications Cardiac arrest only after prolonged anoxia, QRS widening following overdose, suspected hyperkalemia, known acidosis

Contraindications None

Precautions Use with caution in patients with CHF. If the same IV line will be used for calcium chloride, line must be flushed first.

Side-Effects Metabolic alkalosis, increased sodium

Dosage 1 mEq/kg

Route IV/IO

Pediatric Dosage Same dose, dilute 1:1 with saline

Succinylcholine (Anectine)

Class Short-acting depolarizing paralytic

Action Prevents degradation of acetylcholine at the motor-end plate

Indications Paralysis in RSI

Contraindications Hyperkalemia, muscle disease, penetrating eye injury/glaucoma, increased ICP

Precautions Major burns older than 24 hrs, crush injury older than 72 hrs, denervation process (para-quadriplegia); allergic reactions are not uncommon

Side-Effects Hyperkalemia, bradycardia, masseter muscle spasm, malignant hyperthermia, increased ICP

Dosage 1-1.5 mg/kg

Route IV/IO/IM

Pediatric Dosage **Call Medical Command**

Vasopressin (Pitressin)

Class Anterior pituitary hormone

Action Stimulates smooth muscle resulting in vasoconstriction

Indications Ventricular Fibrillation, PEA/Asystole

Contraindications None in cardiac arrest

Precautions None in cardiac arrest

Side-Effects None in cardiac arrest

Dosage 40 units (once only)

Route IV/IO

Pediatric Dosage None

Vecuronium (Norcuronium)

Class Non-depolarizing neuromuscular blocker

Action Prevents acetylcholine from binding to receptors on the motor-end plate

Indications Post-intubation paralysis

Contraindications Hypersensitivity to drug or bromides

Precautions Caution in elderly

Side-Effects Respiratory insufficiency, apnea

Dosage Post-intubation: 0.1 mg/kg

Route IV/IO

Pediatric Dosage **Call Medical Command**